11B

MEMORANDUM
For Meeting of January 13, 2009

TO: Mayor and Councilmembers
THROUGH: Steve Worthington
FROM: Russ Blount
RE: **New Business** – Potential Agreement to provide Sewer Service to the City of Edgewood

REPORT IN BRIEF: Provide an update regarding discussions with the City of Edgewood.

BACKGROUND: Edgewood negotiated with the City of Fife and others from 2004 through 2006 regarding potential sewer service to Edgewood's downtown core. Edgewood determined that the Lakehaven Utility District, headquartered in Federal Way, was the most appropriate provider of such services and in January 2007 Edgewood executed an interlocal agreement with Lakehaven for such services.

Edgewood's decision to contract with Lakehaven rather than Fife was based on a number of factors, not least of which was the need to fund substantial improvements to Fife's system necessary to convey flows from Edgewood to the Tacoma Central Treatment Plant. Edgewood subsequently asked Fife to develop a proposal to provide sewer service to a much smaller portion of Edgewood, recognizing that Fife might be able to convey smaller flows with substantially fewer capital improvements.

In May, 2008, the Fife City Council approved Resolution 1211, authorizing an interlocal agreement with Edgewood through which Edgewood would fund a study of the feasibility of such sewer service. Edgewood executed the interlocal agreement in July, 2008.

ATTACHMENTS: "Evaluation of Impacts to Existing City of Fife Sewer System with Wheeled Sewer Flows (0.411 mgd) from the City of Edgewood" prepared by Tetra Tech and dated December 9, 2008.

DISCUSSION: Edgewood's additional flow would have minimal impact on Fife's system, recognizing that significant improvements to Fife's system will be necessary regardless of Edgewood's connection. If Edgewood were to connect this year, with an instant jump to 100 percent of the analyzed flow, no improvements would be necessary to Fife's system, but the time at which anticipated future improvements would be necessary would be accelerated.

FISCAL IMPACT: The inflation-escalated cost of the anticipate future improvements is currently estimated as $8,920,500; if the Edgewood flows generated general facility charge (GFC) payments at the rates of one GFC per 230 gpd and $6,022 per GFC (1.5 times the in-city rate), the GFC payments would total approximately $10,761,300. The excess of GFC payments versus capital expense could be used to retire Fife's debt for pump stations 13, 5, and 6; and associated force mains; used to convey Edgewood's flows.

ALTERNATIVE COURSES OF ACTION:

1. Allow staff to proceed to negotiate in this general direction, towards a draft agreement to be presented to the Council for discussion and eventual action.
2. Provide direction to staff regarding specific concerns to be addressed either in the agreement or in analyzing the benefit of the agreement.

RECOMMENDATIONS: Provide direction to staff regarding specific concerns to be addressed either in the agreement or in analyzing the benefit of the agreement.

SUGGESTED MOTION: None required.

Russ Blount
Public Works Director

Approved for Agenda

Steve Worthington
City Manager

TETRA TECH

Memorandum

Date: December 9, 2008

To: Russ Blount, P.E., Public Works Director
City of Fife

c: *Central Files, Doug Genzlinger*

From: Jim McCall

Project No./Name: 135-12584-08-172

Subject: Evaluation of Impacts to Existing City of Fife Sewer System with Wheeled Sewer Flows (0.411 mgd) from the City of Edgewood

BACKGROUND AND PURPOSE

The City of Fife has expressed interest in the possibility of wheeling some sewer flow from the City of Edgewood through the City of Fife sewer system to the City of Tacoma Wastewater Treatment Plant.

In 2004, a memo was prepared by Tetra Tech (formerly Tetra Tech/KCM) that discussed possible piping scenarios and improvements to the City of Fife's sewer system that would be needed in order to accept up to a maximum of 1.4 million gallons per day (mgd) from the City of Edgewood. Since 2004, some of the recommendations in the memo have been incorporated into the existing system.

On July 15, 2008 an interlocal agreement was made between these two cities to wheel an estimated annual average flow of 0.109 mgd and a peak flow rate of 0.411 mgd (285 gpm) through the City of Fife sewer system. The wheeled flow would be generated from an area of about 60 buildable acres (about 300 homes) and flow towards Pumps Station #13 through an 18 inch pipe along 26th Street East (see Figure 1).

This Technical Memorandum evaluates the impacts upon the existing system from Pump Station No. 13 through Pump Stations No. 8, No. 6 and No. 5 and the conveyance lines between them (see Figure 1).

The current piping configuration has Pump Station No. 11 discharging to a separate Pierce County pipeline around the northern edge of the City of Fife so that this flow does not currently enter into the City's system. The City of Fife will discuss with Pierce County and the City of Tacoma the continued diversion of this flow around the City system.

CURRENT PUMP CAPACITY

Limited pumping data for the period of February 11 through June 9, 2008 was reviewed for Pump Stations No 5, 6, 11, and 13. This data listed only the number of minutes that each pump operated during

the period between pump station visits. There was no indication if more than one pump operated at any given time.

Pump Station No. 11

Pump Station No. 11 currently receives gravity flow from a few warehouses on 70th Avenue East. Two additional warehouses pump directly from a single pump station into the 12-inch force main downstream of Pump Station No. 11 on 70th Avenue East. Total estimated run time of these pumps is approximately 24 minutes per week. February and March 2003 records for Pump Station No. 11 indicate that the station only pumped 4 minutes per month, for an average rate of about 175 to 180 gallons per day (based upon a pumping rate of about 1,350 gpm).

Pump Station No. 11 was originally designed and built by Pierce County with the intent of conveying flows from the area south of the Burlington Northern Railroad tracks and the area between 70th Avenue East and Freeman Road. This area is now served by Pump Station #12. Pump Station No. 11 is considerably underutilized and will likely remain that way for many years given the planned extension of Highway 167 between 70th Ave. East and Freeman Road. This pump station currently pumps north along 70th Ave. E. and discharges to the Pierce County system north of Interstate 5. When Pump Station #13 was constructed in 2001, provisions were made in the gravity sewer manhole in the intersection of 20th Street E. and 70th Ave. E. to accept future flow from Pump Station No. 11 should it be decided to redirect that flow through the Fife wastewater system.

Pump Station No. 11 will not be affected by the wheeled flow from Edgewood as the flow does not enter this pump station.

Pump Station No. 13

Pump Station No. 13 currently accepts flow from a few local warehouse buildings on 70th Avenue East and will be the initial recipient of the wheeled flow from Edgewood. Pump data shows that this station only pumps 40 minutes per day through two pumps. Using the Phase I designed average pumping rate of 0.8 mgd (550 gpm) for each pump indicates that the present daily average inflow rate is about 0.02 mgd (14 gpm). Currently this pump station appears to be well under utilized. If this station received all of Edgewood's projected peak flow of 0.411 mgd immediately this would put the station at capacity and a third pump would be needed. Once a third pump was added, the station could then accept an additional 0.35mgd from localized growth before the pumps would have to be replaced to pump 1.2 mgd and the downstream 6-inch force main would also need to be upgraded with an 8-inch force main. The City has expressed an interest in installing an on-site emergency generator when the pump station is upgraded with additional pumps.

Pump Station No. 13 pumps to an existing 12-inch gravity sewer line at the intersection of 20th Street E. and 70th Ave. E.. The 12-inch line has a capacity of roughly 0.95 mgd. In 2004, this line carried an average daily flow of around 0.043 mgd. Although no recent flow measurements were taken in this line for this analysis, it appears that this line can handle Edgewood's flow and some addition growth from PS No. 11 and No. 13, before it must be replaced from 70th Ave. E. to Pump Station No. 8. Should the flow from Pump Station No. 11 be redirected to Pump Station No. 8. this would add less than 200 gallons per day to the City of Fife system, an insignificant flow.

Pump Station No. 8

Within the past year, the two pumps in Pump Station No. 8 were replaced with higher capacity pumps and flows were redirected to the new 14" HDPE (12" nominal size) force main between Pump Station No. 8 and Pump Station No. 6, which freed up additional capacity in the downstream gravity sewer line on 20th Street E.. For this evaluation Tetra Tech was instructed to use the pump curves for the two new pumps the City purchased for this station. The new pump curves have a design point of 1,200gpm (1.72 mgd) at 36 feet TDH. If both pumps were operating at the same time, the combined flow would be about 2,200 gpm (3.17 mgd) due to the friction loss in the new force main. In 2004, flow records indicated that this station was underutilized, pumping only about 0.43 mgd. This station does have capacity to accept Edgewood flow until such time as the flow rate exceeds 1.72 mgd and the pumps would need to be replaced, or more likely the entire station would need to be rebuilt due to space restrictions. When rebuilt, the City would also like to add a permanent on-site emergency generator.

Pump Stations No. 6

Pump Stations No. 6 has three pumps rated at an average of about 2,170gpm at 24 feet TDH each. The data reviewed showed that this station pumped for an average of about 544 minutes total pumping time (for all three pumps) per day. Using the designed average pumping rate of 2,170 gpm (3.12 mgd) for each pump indicates that the daily average inflow rate is about 820 gpm (1.18mgd). The records do not indicate whether more than one pump operated at any given time during this period.

Pump Stations No. 5

Pump Stations No. 5 is located downstream of Pump Station No.6. This Pump Station also has three pumps, rated at an average of about 1,600gpm at 57 feet TDH each. These pumps are designed to pump against the higher head requirement needed to lift flow across the Puyallup River. The data reviewed showed that this station also pumped for about 544 minutes total pumping time per day. Using the designed average pumping rate of 1,600 gpm (2.3mgd)for each pump indicates that the average daily inflow rate was about 605 gpm, which is about 75% of the above estimated flow entering and being pumped by Pump Station No. 6. At the time of this study, we understand the meter at Pump Station No. 6 is not working and may be the reason for the discrepancy. Although there is a minor bust in the data, we feel comfortable with the general magnitude of flow. To accurately evaluate the flows requires either accurate flow meter values or tabulated/recorded pump discharge pressures to establish the actual pumping rate at each pump station.

Probable Construction Cost Estimate

As growth occurs over time, the City will need to replace and/or upgrade portions of its wastewater infrastructure to accept peak flows from the City of Fife and the 0.041 mgd peak flow from the City of Edgewood. Attachment A shows the probable construction costs of the various wastewater components that must be upgraded along 20th Street East and 70th Avenue East as growth occurs. The time frame as to when these various components should be replaced will fluctuate, so a general assumption is made that all of them will occur around year 2014. The estimate assumes that new permanent emergency generators set will be installed at Pump Stations 8 and 13.

CONCLUSIONS:

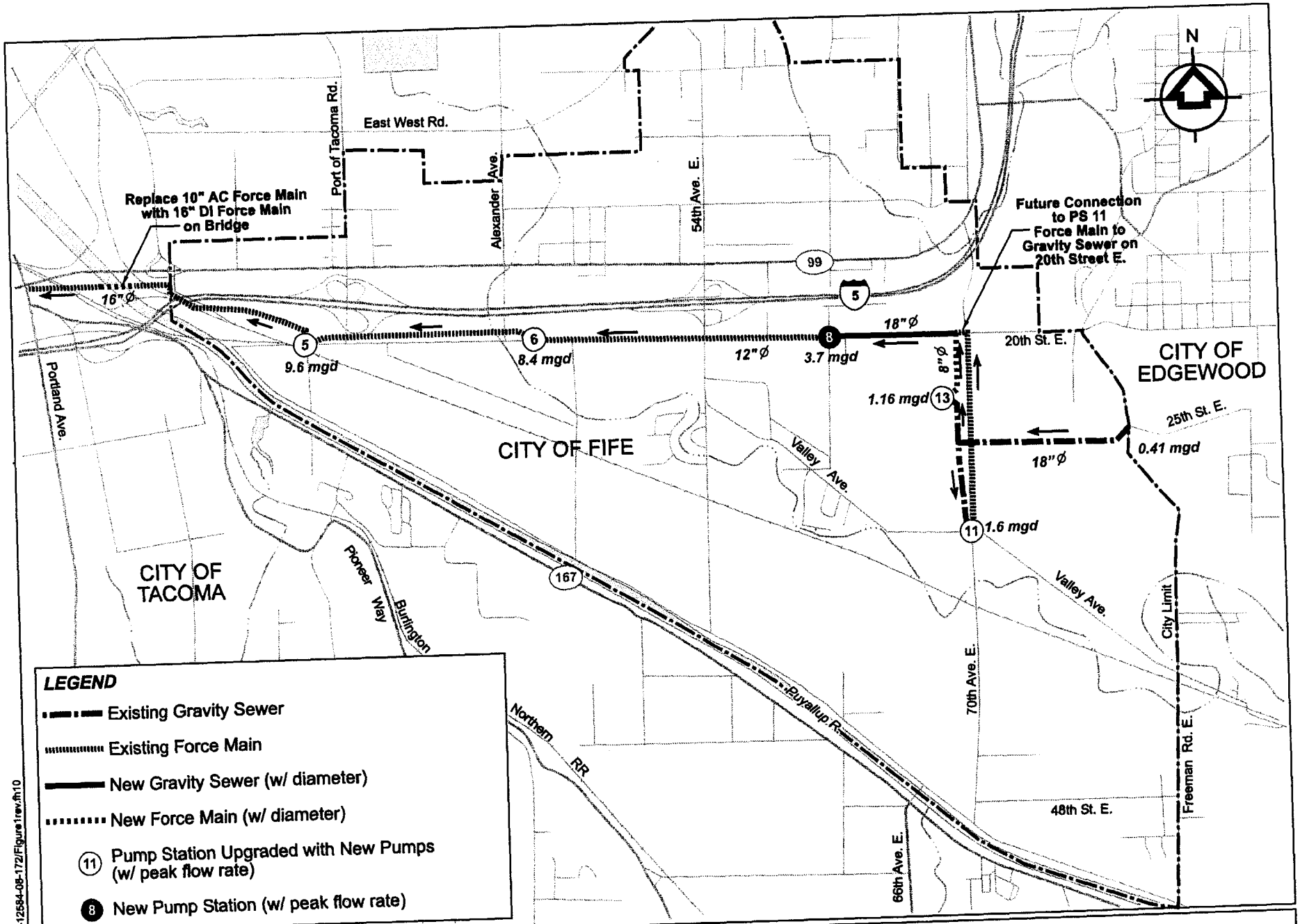
Pump Station No. 5 & No. 6. Even with the discrepancy in flow data between Pump Stations 5 and 6, both stations have sufficient Phase 1 capacities of 4.11 mgd and 4.0 mgd, respectively to accommodate the additional flow from Edgewood at this time.

Pump Station No. 13. The 1999 preliminary design report for LID 98-2 indicated that the two pump stations No. 11 and No. 13 will have a total peak flow of 2.36 mgd going to the intersection of 70th Avenue East and 20th Street East. Since then, developments have not progressed at the rate originally anticipated. In addition, the future construction of a major highway intertie (Route 167 to I-5), when combined with the lower development, will likely limit the total future flows from PS No. 11 and PS No. 13 to about 75% of previous projections, or about 1.77 mgd. Currently, it appears that PS No. 13 can accept Edgewood's peak flow of 0.411 mgd but it would then require a third pump to be added in PS No. 13 as more localized development occurs.

Gravity Sewer to Pump Station No. 8. Once flows exceed 0.95 mgd at the intersection of 20th Street E. and 70th Ave. E. (flows from Edgewood, PS No. 11, & PS No. 13) the 12-inch gravity sewer will need to be replaced with an 18-inch gravity sewer line laid at the same slope as the 12-inch line of 0.15%.

Pump Station No. 8. It appears that Pump Station No. 8 can handle the additional Edgewood flow until such time as flows reach 1.72 mgd (capacity of one pump running). Currently the station is pumping around 0.4 to 0.5 mgd. Once it reaches capacity of 1.72 mgd, the pump station will likely need to be replaced due to limited space restrictions in the station.

It appears that the City of Fife can accept the proposed flow from Edgewood, but the upgrades described above and shown on Figure 1 and Attachment A, will ultimately have to be done as maximum build out occurs.



135-12584-08-172/Figure1rev.fh10

Tetra Tech/ INW
1420 Fifth Ave. #600
Seattle, Washington 98101

135-12584-08-172

Figure 1.
FUTURE SANITARY SEWER IMPROVEMENTS ALONG 20TH ST. E. AND 70TH AVE. E CORRIDOR WITH CITY OF EDGEWOOD FLOW TO PUMP STA. 13

ATTACHMENT A

PROBABLE PROJECT COST ESTIMATE

FUTURE SEWER SYSTEM IMPROVEMENTS WITH CITY OF EDGEWOOD FLOW TO PUMP STATION 13

Updated 12-3-08, DDG

Gravity Sewers

Location	From	To	Dia. (in)	Length (ft)	Cost/lf	Const. Cost	Contingency	Subtotal	Engr, Allied, Legal, Const. Admin., Taxes	2009 Total	2014 Escalated Total
20th St. E.	70th Ave. E.	PS #8	18	2,800	$ 610	$ 1,700,000	$ 425,000	$ 2,125,000	$ 744,000	$ 2,869,000	$ 3,326,000
				2,800		1,700,000	425,000	2,125,000	744,000	2,869,000	3,326,000

Force Mains

Location	From	To	Diameter (in)	Length (ft)	Cost/lf	Const. Cost	Contingency	Subtotal	Engr, Allied, Legal, Const. Admin., Taxes	2009 Total	2014 Escalated Total
Pac. Hwy Bridge	Fife	Tacoma	16	1,800	$ 750	$ 1,350,000	$ 337,500	$ 1,687,500	$ 591,000	$ 2,278,500	$ 2,641,000
70th Ave. E	PS #13	20th St. E.	8	650	$ 100	$ 65,000	$ 16,250	$ 81,250	$ 28,000	$ 109,250	$ 127,000
				2,450		1,415,000	353,750	1,768,750	619,000	2,387,750	2,768,000

Pump Stations

Pump Station	Ultimate Peak Capacity (MGD)	Pump Station Const. Cost	Contingency	Sub Total	Engr, Allied. Legal. Const. Admin., Taxes	2009 Total	2014 Escalated Total	Remarks
PS 13	1.16	$ 75,000	$ 18,750	$ 93,750	$ 33,000	$ 126,750	$ 146,900	Add 1 Pump and change impellers on 2 pumps, add EG set.
PS 8	3.70	$ 1,300,000	$ 325,000	$ 1,625,000	$ 569,000	$ 2,194,000	$ 2,543,400	New Station (10' dia. W/ 3 pumps & EG set)
PS 6	8.40	$ 35,000	$ 8,750	$ 43,750	$ 15,000	$ 58,750	$ 68,100	Add 2 pumps & motors, change impellors on 3 pumps.
PS 5	9.60	$ 35,000	$ 8,750	$ 43,750	$ 15,000	$ 58,750	$ 68,100	Add 2 pumps & motors, change impellors on 3 pumps.
		$ 1,445,000	$ 361,250	$ 1,806,250	$ 632,000	$ 2,438,250	$ 2,826,500	

Summary

	Sub Total	Engineering, Allied, Legal, Const. Admin.,	2009 Total	2014 Escalated Total
Gravity Sewers	$ 2,125,000	$ 744,000	$ 2,869,000	$ 3,326,000
Force Mains	$ 1,768,750	$ 619,000	$ 2,387,750	$ 2,768,000
Pump Stations	$ 1,806,250	$ 632,000	$ 2,438,250	$ 2,826,500
Total	$ 5,700,000	$ 1,995,000	$ 7,695,000	$ 8,920,500

Assumptions

Contingencies:	25%
Escalation Rate:	3% annual
Escalation Term:	5 years
Engr., Legal, Admin., Taxes	35%

Tetra Tech, Inc.

Tetra Tech, Inc. * 1420 Fifth Avenue, Suite 600, * Seattle, WA 98101-3941 * Tel 206-883-9300 * Fax 206-883-9301

APPENDIX A.

DATA FROM PUMP STATIONS NO. 5, 6, 11, 12 AND 13 DURING FEBRUARY THROUGH MAY 2008

Technical Memorandum:
Impacts to Existing City of Fife Sewer System with Wheeled Sewer Flow from the City of Edgewood

October 2008

Lift Station Operation Log, PS#13

Transcribed from copy of hand tabulated log by City

Pump 1 & 2, Approx Flow, Each 525 gpm Flow is ave of design data points

Date	Hour	Min	Duration Days	Hrs	Min.	Total Min	Pump 1 Min Meter	Pump 2 Min Meter	Pump 1 Time, Min	Pump 2 Time, Min	Pump 1 Gal	Pump 2 Gal	Total Gal	24 hr Ave GPM	24 hr Total GPM
2/15/08	8	45					18652	18591							
2/19/08	9	16	4	1	-29	5791	18727	18650	75	59	39375	30975	70350	12.1	17493
2/22/08	9	16	3	0	0	4320	18797	18716	70	66	36750	34650	71400	16.5	23800
2/25/08	8	57	3	-1	41	4301	18845	18767	48	51	25200	26775	51975	12.1	17402
2/29/08	9	10	4	1	-47	5773	18924	18847	79	80	41475	42000	83475	14.5	20822
3/3/08	8	36	3	-1	26	4286	18983	18895	59	48	30975	25200	56175	13.1	18874
3/7/08	8	42	4	0	6	5766	19058	18965	75	70	39375	36750	76125	13.2	19011
3/10/08	8	28	3	0	-14	4306	19108	19011	50	46	26250	24150	50400	11.7	16855
3/14/08	8	53	4	0	25	5785	19189	19087	81	76	42525	39900	82425	14.2	20517
3/17/08	10	19	3	2	-34	4406	19243	19142	54	55	28350	28875	57225	13.0	18703
3/21/08	8	33	4	-2	14	5654	19326	19222	83	80	43575	42000	85575	15.1	21795
3/25/08	8	21	4	0	-12	5748	19396	19283	70	61	36750	32025	68775	12.0	17230
3/28/08	8	35	3	0	14	4334	19455	19340	59	57	30975	29925	60900	14.1	20234
3/31/08	8	59	3	0	24	4344	19517	19389	62	49	32550	25725	58275	13.4	19318
4/4/08	11	14	4	3	-45	5895	19589	19461	72	72	37800	37800	75600	12.8	18467
4/7/08	8	59	3	-3	45	4185	19643	19506	54	45	28350	23625	51975	12.4	17884
4/11/08	10	56	4	2	-3	5877	19718	19589	75	83	39375	43575	82950	14.1	20325
4/14/08	11	18	3	1	-38	4342	19773	19646	55	57	28875	29925	58800	13.5	19501
4/18/08	8	55	4	-3	37	5617	19859	19740	86	94	45150	49350	94500	16.8	24226
4/21/08	8	48	3	0	-7	4313	19908	19791	49	51	25725	26775	52500	12.2	17528
4/25/08	8	16	4	0	-32	5728	19989	19880	81	89	42525	46725	89250	15.6	22437
4/28/08	8	56	3	0	40	4360	20041	19934	52	54	27300	28350	55650	12.8	18380
5/2/08	13	35	4	5	-21	6039	20134	20042	93	108	48825	56700	105525	17.5	25162
5/5/08	9	9	3	-4	-26	4054	20184	20092	50	50	26250	26250	52500	13.0	18648
5/9/08	11	20	4	2	11	5891	20292	20199	108	107	56700	56175	112875	19.2	27591
5/13/08	7	54	4	-4	34	5554	20393	20299	101	100	53025	52500	105525	19.0	27360
5/16/08	10	41	3	3	-13	4487	20484	20392	91	93	47775	48825	96600	21.5	31002
5/19/08	13	21	3	3	-20	4480	20548	20447	64	55	33600	28875	62475	13.9	20081
5/23/08	8	35	4	-5	14	5474	20635	20537	87	90	45675	47250	92925	17.0	24445
5/27/08	8	54	4	0	19	5779	20724	20608	89	71	46725	37275	84000	14.5	20931
5/30/08	10	34	3	2	-20	4420	20788	20618	64	10	33600	5250	38850	8.8	12657

Days 105

Total Minutes 151309

Ea. Pump		
Total Min.	2136	2027
Ave min per day	20.3	19.3

Total ave. per day 39.6 Min.

Total Gal Pumped	Overall Ave GPM
2185575	14.44445

Lift Station Operation Log, PS#12

Transcribed from copy of hand tabulated log by City
Pumps: Cornell ? ?RPM, ?" Imp. Approx Flow 1115 gpm Flow is ave of design data points

Date	Hour	Min	Duration Days	Hrs	Min.	Total Min	Pump 1 Min Meter	Pump 2 Min Meter	Pump 1 Time, Min	Pump 2 Time, Min	Pump 1 Gal	Pump 2 Gal	Total Gal	24 hr Ave GPM	24 hr Total GPM
2/11/08	8	17					66007	71238							
2/15/08	8	18	4	0	1	5761	66516	72223	509	985	567535	1098275	1665810	289.2	416380
2/19/08	8	30	4	0	12	5772	67403	72272	887	49	989005	54635	1043640	180.8	260368
2/22/08	8	32	3	0	2	4322	67786	72655	383	383	427045	427045	854090	197.6	284565
2/25/08	8	36	3	0	4	4324	68137	73142	351	487	391365	543005	934370	216.1	311169
2/29/08	8	18	4	0	-18	5742	68539	73648	402	506	448230	564190	1012420	176.3	253898
3/3/08	8	25	3	0	7	4327	68871	74061	332	413	370180	460495	830675	192.0	276444
3/7/08	8	30	4	0	5	5765	69299	74741	428	680	477220	758200	1235420	214.3	308587
3/10/08	8	19	3	0	-11	4309	69664	75120	365	379	406975	422585	829560	192.5	277226
3/14/08	8	15	4	0	-4	5756	70133	75661	469	541	522935	603215	1126150	195.6	281733
3/17/08	8	36	3	0	21	4341	70537	76120	404	459	450460	511785	962245	221.7	319197
3/21/08	8	11	4	0	-25	5735	71032	76617	495	497	551925	554155	1106080	192.9	277725
3/25/08	9	6	4	1	-5	5815	71446	77764	414	1147	461610	1278905	1740515	299.3	431013
3/28/08	8	16	3	-1	10	4270	72130	78734	684	970	762660	1081550	1844210	431.9	621935
3/31/08	8	33	3	0	17	4337	73071	79821	941	1087	1049215	1212005	2261220	521.4	750786
4/4/08	8	17	4	0	-16	5744	73892	80656	821	835	915415	931025	1846440	321.5	462896
4/7/08	8	19	3	0	2	4322	74293	81092	401	436	447115	486140	933255	215.9	310941
4/11/08	8	53	4	0	34	5794	74867	81869	574	777	640010	866355	1506365	260.0	374381
4/14/08	8	37	3	0	-16	4304	75169	82433	302	564	336730	628860	965590	224.3	323060
4/18/08	8	23	4	0	-14	5746	75651	82897	482	464	537430	517360	1054790	183.6	264340
4/21/08	8	5	3	0	-18	4302	76027	83292	376	395	419240	440425	859665	199.8	287754
4/25/08	8	0	4	0	-5	5755	76497	83945	470	653	524050	728095	1252145	217.6	313308
4/28/08	8	12	3	0	12	4332	76698	84498	201	553	224115	616595	840710	194.1	279460
5/2/08	13	14	4	5	2	6062	77040	85170	342	672	381330	749280	1130610	186.5	268571
5/5/08	8	13	3	-5	-1	4019	77380	85528	340	358	379100	399170	778270	193.6	278853
5/9/08	8	45	4	0	32	5792	77839	85996	459	468	511785	521820	1033605	178.5	256974
5/13/08	8	10	4	0	-35	5725	78187	86373	348	377	388020	420355	808375	141.2	203329
5/16/08	8	19	3	0	9	4329	78641	86816	454	443	506210	493945	1000155	231.0	332692
5/19/08	8	18	3	0	-1	4319	78975	87193	334	377	372410	420355	792765	183.6	264316
5/23/08	8	23	4	0	5	5765	79377	87676	402	483	448230	538545	986775	171.2	246480
5/27/08	8	8	4	0	-15	5745	79855	88144	478	468	532970	521820	1054790	183.6	264386

Days 106

Total Minutes 152631

Ea. Pump		
Total Min.	13848	16906
Ave min. per day	130.6	159.5

Total ave. per day 290.1 Min.

Total Gal Pumped	Overall Ave GPM
34290710	224.6641

Lift Station Operation Log, PS#11

This flow is pumped to PS 8

Transcribed from copy of hand tabulated log by City

Pumps: Cornell ? ?RPM, ?" Imp. Approx Flow

73 gpm NUMBER IS A PLACE HOLDER FOR NOW

Flow velocity in 4" FM if pump discharges were additive = 3.727

Date	Hour	Min	Duration Days	Hrs	Min.	Total Min	Pump 1 Min Meter	Pump 2 Min Meter	Pump 1 Time, Min	Pump 2 Time, Min	Pump 1 Gal	Pump 2 Gal	Total Gal	24 hr Ave GPM	24 hr Total GPM
2/22/08	11	9					449.0	435.9							
2/25/08	10	50	3	-1	41	4301	449.6	436.4	0.6	0.5	43.8	36.5	80.3	0.019	27
2/29/08	10	53	4	0	3	5763	450.2	437.1	0.6	0.7	43.8	51.1	94.9	0.016	24
3/3/08	10	49	3	0	-4	4316	450.8	437.7	0.6	0.6	43.8	43.8	87.6	0.020	29
3/7/08	13	1	4	3	-48	5892	451.5	438.4	0.7	0.7	51.1	51.1	102.2	0.017	25
3/10/08	10	48	3	-3	47	4187	452.0	439.0	0.5	0.6	36.5	43.8	80.3	0.019	28
3/14/08	11	0	4	1	-48	5772	452.6	439.7	0.6	0.7	43.8	51.1	94.9	0.016	24
3/17/08	12	49	3	1	49	4429	453.4	440.3	0.8	0.6	58.4	43.8	102.2	0.023	33
3/21/08	10	40	4	-2	-9	5631	454.0	441.0	0.6	0.7	43.8	51.1	94.9	0.017	24
3/25/08	12	53	4	2	13	5893	454.7	441.7	0.7	0.7	51.1	51.1	102.2	0.017	25
3/28/08	10	44	3	-2	-9	4191	455.3	442.2	0.6	0.5	43.8	36.5	80.3	0.019	28
3/31/08	11	34	3	1	-10	4370	455.8	442.8	0.5	0.6	36.5	43.8	80.3	0.018	26
4/4/08	13	2	4	2	-32	5848	456.5	443.5	0.7	0.7	51.1	51.1	102.2	0.017	25
4/7/08	11	20	3	-2	18	4218	457.1	444.1	0.6	0.6	43.8	43.8	87.6	0.021	30
4/11/08	13	48	4	2	28	5908	457.8	444.8	0.7	0.7	51.1	51.1	102.2	0.017	25
4/14/08	9	1	3	-4	-47	4033	458.3	445.3	0.5	0.5	36.5	36.5	73	0.018	26
4/18/08	11	12	4	2	11	5891	459.1	446.1	0.8	0.8	58.4	58.4	116.8	0.020	29
4/21/08	13	13	3	2	1	4441	459.6	446.7	0.5	0.6	36.5	43.8	80.3	0.018	26
4/25/08	10	47	4	-3	34	5614	460.4	447.5	0.8	0.8	58.4	58.4	116.8	0.021	30
4/28/08	10	40	3	0	-7	4313	460.9	448.0	0.5	0.5	36.5	36.5	73	0.017	24
5/2/08	11	35	4	1	-5	5815	461.6	448.7	0.7	0.7	51.1	51.1	102.2	0.018	25
5/5/08	11	24	3	0	-11	4309	462.2	449.3	0.6	0.6	43.8	43.8	87.6	0.020	29
5/13/08	9	20	8	-2	-4	11396	463.6	450.7	1.4	1.4	102.2	102.2	204.4	0.018	26
5/16/08	14	43	3	5	23	4643	464.2	451.3	0.6	0.6	43.8	43.8	87.6	0.019	27
5/19/08	13	51	3	-1	8	4268	464.7	451.8	0.5	0.5	36.5	36.5	73	0.017	25
5/23/08	11	11	4	-2	-40	5600	465.3	452.5	0.6	0.7	43.8	51.1	94.9	0.017	24
5/27/08	11	11	4	0	0	5760	466.1	453.2	0.8	0.7	58.4	51.1	109.5	0.019	27
5/30/08	13	21	3	2	10	4450	466.8	453.9	0.7	0.7	51.1	51.1	102.2	0.023	33
6/2/08	11	23	3	-2	2	4202	467.3	454.5	0.5	0.6	36.5	43.8	80.3	0.019	28
6/6/08	11	25	4	0	2	5762	468.0	455.2	0.7	0.7	51.1	51.1	102.2	0.018	26
6/9/08	11	30	3	0	5	4325	468.5	455.8	0.5	0.6	36.5	43.8	80.3	0.019	27

Total Minutes	Total Gal Pumped	Overall Ave GPM
2E+05	2876.2	0.018492

Lift Station Operation Log, PS#6

Transcribed from copy of hand tabulated log by City

Pumps 1 Approx Flow 2170 gpm

Pumps 2 Approx Flow 2170 gpm

Pumps 3 Approx Flow 2170 gpm

Flow is ave of design data points

Flow velocity in 8" FM if pumps are additive = 55.405

Date	Hour	Min	Duration Days	Hrs	Min.	Total Min	Pump 1 Min Meter	Pump 2 Min Meter	Pump 3 Min Meter	Pump 1 Time, Min	Pump 2 Time, Min	Pump 3 Time, Min	Total pump Time Min	Pump 1 Gal	Pump 2 Gal	Pump 3 Gal	Total Gal	24 hr Ave GPM	24 hr Total GPM
2/19/08	9	0					212910	239726	231188										
2/22/08	10	14	3	1	14	4394	213464	240264	231725	554	538	537	1629	1202180	1167460	1165290	3534930	804.5	1158466
2/25/08	10	0	3	0	-14	4306	213990	240784	232229	526	520	504	1550	1141420	1128400	1093680	3363500	781.1	1124812
2/28/08	10	22	3	0	22	4342	214692	241430	232852	702	646	623	1971	1523340	1401820	1351910	4277070	985.0	1418466
3/3/08	10	29	4	0	7	5767	215208	241971	233341	516	541	489	1546	1119720	1173970	1061130	3354820	581.7	837687
3/7/08	11	8	4	1	-21	5799	215909	242664	233990	701	693	649	2043	1521170	1503810	1408330	4433310	764.5	1100874
3/10/08	10	24	3	-1	16	4276	216420	243149	234482	511	485	492	1488	1108870	1052450	1067640	3228960	755.1	1087395
3/14/08	10	20	4	0	-4	5756	217131	243835	235166	711	686	684	2081	1542870	1488620	1484280	4515770	784.5	1129727
3/17/08	11	10	3	1	-10	4370	217747	244439	235719	616	604	553	1773	1336720	1310680	1200010	3847410	880.4	1267796
3/21/08	10	40	4	-1	30	5730	218471	245141	236415	724	702	696	2122	1571080	1523340	1510320	4604740	803.6	1157212
3/24/08	11	50	3	1	10	4390	219073	245727	236982	602	586	567	1755	1306340	1271620	1230390	3808350	867.5	1249208
3/28/08	9	13	4	-2	-37	5603	219977	246616	237855	904	889	873	2666	1961680	1929130	1894410	5785220	1032.5	1486831
3/31/08	9	8	3	0	-5	4315	220757	247426	238648	780	810	793	2383	1692600	1757700	1720810	5171110	1198.4	1725701
4/4/08	9	23	4	0	15	5775	221619	248262	239484	862	836	836	2534	1870540	1814120	1814120	5498780	952.2	1371124
4/7/08	10	17	3	1	-6	4374	222184	248808	240043	565	546	559	1670	1226050	1184820	1213030	3623900	828.5	1193053
4/11/08	11	26	4	1	9	5829	222921	249541	240743	737	733	700	2170	1599290	1590610	1519000	4708900	807.8	1163290
4/14/08	11	1	3	0	-25	4295	223468	250073	241269	547	532	526	1605	1186990	1154440	1141420	3482850	810.9	1167708
4/18/08	10	47	4	-1	46	5746	224160	250761	241915	692	688	646	2026	1501640	1492960	1401820	4396420	765.1	1101783
4/21/08	10	58	3	0	11	4331	224696	251278	242429	536	517	514	1567	1163120	1121890	1115380	3400390	785.1	1130585
4/25/08	10	7	4	0	-51	5709	225394	252012	243130	698	734	701	2133	1514660	1592780	1521170	4628610	810.8	1167490
4/28/08	9	2	3	-1	-5	4255	225925	252539	243632	531	527	502	1560	1152270	1143590	1089340	3385200	795.6	1145638
5/2/08	10	14	4	1	12	5832	226642	253254	244365	717	715	733	2165	1555890	1551550	1590610	4698050	805.6	1160012
5/5/08	10	0	3	0	-14	4306	227190	253788	244878	548	532	513	1593	1189160	1154440	1113210	3456810	802.8	1156016
5/9/08	11	5	4	1	5	5825	227922	254494	245548	732	708	670	2110	1588440	1536360	1453900	4578700	786.0	1131902
5/12/08	9	5	3	-2	0	4200	228439	255023	246028	517	529	480	1526	1121890	1147930	1041600	3311420	788.4	1135344
5/16/08	10	16	4	1	11	5831	229178	255740	246723	739	717	695	2151	1603630	1555890	1508150	4667670	800.5	1152709
5/19/08	13	0	3	3	-16	4484	229715	256293	247241	537	553	518	1608	1165290	1200010	1124060	3489360	778.2	1120579
5/23/08	10	19	4	-3	19	5599	230407	256979	247885	692	686	644	2022	1501640	1488620	1397480	4387740	783.7	1128478
5/27/08	10	56	4	0	37	5797	231102	257657	248525	695	678	640	2013	1508150	1471260	1388800	4368210	753.5	1085082
5/30/08	9	3	3	-1	-53	4207	231616	258172	248982	514	515	457	1486	1115380	1117550	991690	3224620	766.5	1103744
6/2/08	10	41	3	1	38	4418	232192	258709	249515	576	537	533	1646	1249920	1165290	1156610	3571820	808.5	1164197

Days	104	Total Minutes	149861

Ea. Pump			
Total Min.	19282	18983	18327
Ave min. per day	185.4	182.5	176.2

Total ave per day 544.2 Min.

Total Gal Pumped	Overall Ave GPM
122804640	819.457

Lift Station Operation Log, PS#5

Transcribed from copy of hand tabulated log by City

Pumps 1 Approx Flow 1600 gpm
Pumps 2 Approx Flow 1600 gpm
Pumps 3 Approx Flow 1600 gpm

Flow is ave of design data points

Flow velocity in 8" FM if pumps are additive = 40.852

Date	Hour	Min	Duration Days	Hrs	Min.	Total Min	Pump 1 Min Meter	Pump 2 Min Meter	Pump 3 Min Meter	Pump 1 Time, Min	Pump 2 Time, Min	Pump 3 Time, Min	Total pump Time Min	Pump 1 Gal	Pump 2 Gal	Pump 3 Gal	Total Gal	24 hr Ave GPM	24 hr Total GPM
2/22/08	10	44					258248	245554	241749										
2/25/08	11	25	3	1	-19	4361	258782	246055	242273	534	501	524	1559	854400	801600	838400	2494400	572.0	823650
2/28/08	10	15	3	-1	-10	4250	259450	246723	242956	668	668	683	2019	1068800	1068800	1092800	3230400	760.1	1094536
3/3/08	10	20	4	0	5	5765	259985	247234	243497	535	511	541	1587	856000	817600	865600	2539200	440.5	634249
3/7/08	11	0	4	1	-20	5800	260694	247913	244200	709	679	703	2091	1134400	1086400	1124800	3345600	576.8	830632
3/10/08	10	29	3	-1	29	4289	261203	248411	244882	509	498	482	1489	814400	796800	771200	2382400	555.5	799873
3/14/08	8	35	4	-2	6	5646	261907	249099	245408	704	688	726	2118	1126400	1100800	1161600	3388800	600.2	864306
3/17/08	11	39	3	3	4	4504	262504	249670	245988	597	571	580	1748	955200	913600	928000	2796800	621.0	894181
3/21/08	10	25	4	-1	-14	5686	263239	250372	246688	735	702	700	2137	1176000	1123200	1120000	3419200	601.3	865925
3/25/08	10	2	4	0	-23	5737	263999	251105	247434	760	733	746	2239	1216000	1172800	1193600	3582400	624.4	899191
3/28/08	9	6	3	-1	4	4264	264661	251753	248116	662	648	682	1992	1059200	1036800	1091200	3187200	747.5	1076353
3/31/08	9	17	3	0	11	4331	265407	252463	248841	746	710	725	2181	1193600	1136000	1160000	3489600	805.7	1160246
4/4/08	10	13	4	1	-4	5816	266242	253201	249665	835	738	824	2397	1336000	1180800	1318400	3835200	659.4	949568
4/7/08	10	49	3	0	36	4356	266798	253811	250206	556	610	541	1707	889600	976000	865600	2731200	627.0	902876
4/11/08	11	19	4	1	-30	5790	267531	254508	250935	733	697	729	2159	1172800	1115200	1166400	3454400	596.6	859125
4/14/08	10	49	3	-1	30	4290	268070	255019	251456	539	511	521	1571	862400	817600	833600	2513600	585.9	843726
4/18/08	10	22	4	0	-27	5733	268771	255690	252158	701	671	702	2074	1121600	1073600	1123200	3318400	578.8	833507
4/21/08	11	19	3	1	-3	4377	269296	256210	252699	525	520	541	1586	840000	832000	865600	2537600	579.8	834851
4/25/08	8	59	4	-3	40	5620	270007	256892	253347	711	682	648	2041	1137600	1091200	1036800	3265600	581.1	836737
4/28/08	9	24	3	1	-35	4345	270547	257402	253928	540	510	581	1631	864000	816000	929600	2609600	600.6	864862
5/2/08	10	8	4	1	-18	5802	271276	258118	254659	729	716	731	2176	1166400	1145600	1169600	3481600	600.1	864099
5/5/08	10	28	3	0	22	4342	271811	258637	255179	535	519	520	1574	856000	830400	832000	2518400	580.0	835213
5/9/08	10	30	4	0	2	5762	272527	259319	255898	716	682	719	2117	1145600	1091200	1150400	3387200	587.9	846506
5/12/08	15	30	3	5	0	4620	273099	259855	256468	572	536	570	1678	915200	857600	912000	2684800	581.1	836821
5/16/08	11	5	4	-4	-25	5495	273757	260519	257143	658	664	675	1997	1052800	1062400	1080000	3195200	581.5	837323
5/19/08	8	41	3	-3	36	4176	274267	261002	257664	510	483	521	1514	816000	772800	833600	2422400	580.1	835310
5/23/08	9	59	4	1	18	5838	275040	261722	258404	773	720	740	2233	1236800	1152000	1184000	3572800	612.0	881266
5/27/08	10	32	4	1	-27	5793	275740	262419	259111	700	697	707	2104	1120000	1115200	1131200	3366400	581.1	836806
5/30/08	10	50	3	0	18	4338	276279	262993	259656	539	574	545	1658	862400	918400	872000	2652800	611.5	880598
6/2/08	10	30	3	0	-20	4300	276810	263459	260184	531	466	528	1525	849600	745600	844800	2440000	567.4	817116
6/6/08	9	20	4	-1	-10	5690	277545	264155	260923	735	696	739	2170	1176000	1113600	1182400	3472000	610.2	878678

Days 105

Total Minutes 145426

	Pump 1	Pump 2	Pump 3
Ea. Pump Total Min.	19297	18601	19174
Ave min. per day	183.8	177.2	182.6

Total ave per day 543.5 Min.

Total Gal Pumped	Overall Ave GPM
87843200	604.0405

Lift Station Operation Log, PS#13

Transcribed from copy of hand tabulated log by City

Pump 1 & 2, Approx Flow, Each 525 gpm Flow is ave of design data points

Date	Hour	Min	Duration Days	Hrs	Min.	Total Min	Pump 1 Min Meter	Pump 2 Min Meter	Pump 1 Time, Min	Pump 2 Time, Min	Pump 1 Gal	Pump 2 Gal	Total Gal	24 hr Ave GPM	24 hr Total GPM
2/15/08	8	45					18652	18591							
2/19/08	9	16	4	1	-29	5791	18727	18650	75	59	39375	30975	70350	12.1	17493
2/22/08	9	16	3	0	0	4320	18797	18716	70	66	36750	34650	71400	16.5	23800
2/25/08	8	57	3	-1	41	4301	18845	18767	48	51	25200	26775	51975	12.1	17402
2/29/08	9	10	4	1	-47	5773	18924	18847	79	80	41475	42000	83475	14.5	20822
3/3/08	8	36	3	-1	26	4286	18983	18895	59	48	30975	25200	56175	13.1	18874
3/7/08	8	42	4	0	6	5766	19058	18965	75	70	39375	36750	76125	13.2	19011
3/10/08	8	28	3	0	-14	4306	19108	19011	50	46	26250	24150	50400	11.7	16855
3/14/08	8	53	4	0	25	5785	19189	19087	81	76	42525	39900	82425	14.2	20517
3/17/08	10	19	3	2	-34	4406	19243	19142	54	55	28350	28875	57225	13.0	18703
3/21/08	8	33	4	-2	14	5654	19326	19222	83	80	43575	42000	85575	15.1	21795
3/25/08	8	21	4	0	-12	5748	19396	19283	70	61	36750	32025	68775	12.0	17230
3/28/08	8	35	3	0	14	4334	19455	19340	59	57	30975	29925	60900	14.1	20234
3/31/08	8	59	3	0	24	4344	19517	19389	62	49	32550	25725	58275	13.4	19318
4/4/08	11	14	4	3	-45	5895	19589	19461	72	72	37800	37800	75600	12.8	18467
4/7/08	8	59	3	-3	45	4185	19643	19506	54	45	28350	23625	51975	12.4	17884
4/11/08	10	56	4	2	-3	5877	19718	19589	75	83	39375	43575	82950	14.1	20325
4/14/08	11	18	3	1	-38	4342	19773	19646	55	57	28875	29925	58800	13.5	19501
4/18/08	8	55	4	-3	37	5617	19859	19740	86	94	45150	49350	94500	16.8	24226
4/21/08	8	48	3	0	-7	4313	19908	19791	49	51	25725	26775	52500	12.2	17528
4/25/08	8	16	4	0	-32	5728	19989	19880	81	89	42525	46725	89250	15.6	22437
4/28/08	8	56	3	0	40	4360	20041	19934	52	54	27300	28350	55650	12.8	18380
5/2/08	13	35	4	5	-21	6039	20134	20042	93	108	48825	56700	105525	17.5	25162
5/5/08	9	9	3	-4	-26	4054	20184	20092	50	50	26250	26250	52500	13.0	18648
5/9/08	11	20	4	2	11	5891	20292	20199	108	107	56700	56175	112875	19.2	27591
5/13/08	7	54	4	-4	34	5554	20393	20299	101	100	53025	52500	105525	19.0	27360
5/16/08	10	41	3	3	-13	4487	20484	20392	91	93	47775	48825	96600	21.5	31002
5/19/08	13	21	3	3	-20	4480	20548	20447	64	55	33600	28875	62475	13.9	20081
5/23/08	8	35	4	-5	14	5474	20635	20537	87	90	45675	47250	92925	17.0	24445
5/27/08	8	54	4	0	19	5779	20724	20608	89	71	46725	37275	84000	14.5	20931
5/30/08	10	34	3	2	-20	4420	20788	20618	64	10	33600	5250	38850	8.8	12657

Days	105	Total Minutes 151309	Ea. Pump Total Min.	2136	2027
			Ave min per day	20.3	19.3
			Total ave. per day	39.6 Min.	

Total Gal Pumped	Overall Ave GPM
2185575	14.44445

Lift Station Operation Log, PS#12

Transcribed from copy of hand tabulated log by City

Pumps: Cornell ? ?RPM, ?" Imp. Approx Flow 1115 gpm Flow is ave of design data points

Date	Hour	Min	Duration Days	Hrs	Min.	Total Min	Pump 1 Min Meter	Pump 2 Min Meter	Pump 1 Time, Min	Pump 2 Time, Min	Pump 1 Gal	Pump 2 Gal	Total Gal	24 hr Ave GPM	24 hr Total GPM
2/11/08	8	17					66007	71238							
2/15/08	8	18	4	0	1	5761	66516	72223	509	985	567535	1098275	1665810	289.2	416380
2/19/08	8	30	4	0	12	5772	67403	72272	887	49	989005	54635	1043640	180.8	260368
2/22/08	8	32	3	0	2	4322	67786	72655	383	383	427045	427045	854090	197.6	284565
2/25/08	8	36	3	0	4	4324	68137	73142	351	487	391365	543005	934370	216.1	311169
2/29/08	8	18	4	0	-18	5742	68539	73648	402	506	448230	564190	1012420	176.3	253898
3/3/08	8	25	3	0	7	4327	68871	74061	332	413	370180	460495	830675	192.0	276444
3/7/08	8	30	4	0	5	5765	69299	74741	428	680	477220	758200	1235420	214.3	308587
3/10/08	8	19	3	0	-11	4309	69664	75120	365	379	406975	422585	829560	192.5	277226
3/14/08	8	15	4	0	-4	5756	70133	75661	469	541	522935	603215	1126150	195.6	281733
3/17/08	8	36	3	0	21	4341	70537	76120	404	459	450460	511785	962245	221.7	319197
3/21/08	8	11	4	0	-25	5735	71032	76617	495	497	551925	554155	1106080	192.9	277725
3/25/08	9	6	4	1	-5	5815	71446	77764	414	1147	461610	1278905	1740515	299.3	431013
3/28/08	8	16	3	-1	10	4270	72130	78734	684	970	762660	1081550	1844210	431.9	621935
3/31/08	8	33	3	0	17	4337	73071	79821	941	1087	1049215	1212005	2261220	521.4	750786
4/4/08	8	17	4	0	-16	5744	73892	80656	821	835	915415	931025	1846440	321.5	462896
4/7/08	8	19	3	0	2	4322	74293	81092	401	436	447115	486140	933255	215.9	310941
4/11/08	8	53	4	0	34	5794	74867	81869	574	777	640010	866355	1506365	260.0	374381
4/14/08	8	37	3	0	-16	4304	75169	82433	302	564	336730	628860	965590	224.3	323060
4/18/08	8	23	4	0	-14	5746	75651	82897	482	464	537430	517360	1054790	183.6	264340
4/21/08	8	5	3	0	-18	4302	76027	83292	376	395	419240	440425	859665	199.8	287754
4/25/08	8	0	4	0	-5	5755	76497	83945	470	653	524050	728095	1252145	217.6	313308
4/28/08	8	12	3	0	12	4332	76698	84498	201	553	224115	616595	840710	194.1	279460
5/2/08	13	14	4	5	2	6062	77040	85170	342	672	381330	749280	1130610	186.5	268571
5/5/08	8	13	3	-5	-1	4019	77380	85528	340	358	379100	399170	778270	193.6	278853
5/9/08	8	45	4	0	32	5792	77839	85996	459	468	511785	521820	1033605	178.5	256974
5/13/08	8	10	4	0	-35	5725	78187	86373	348	377	388020	420355	808375	141.2	203329
5/16/08	8	19	3	0	9	4329	78641	86816	454	443	506210	493945	1000155	231.0	332692
5/19/08	8	18	3	0	-1	4319	78975	87193	334	377	372410	420355	792765	183.6	264316
5/23/08	8	23	4	0	5	5765	79377	87676	402	483	448230	538545	986775	171.2	246480
5/27/08	8	8	4	0	-15	5745	79855	88144	478	468	532970	521820	1054790	183.6	264386

Days	106	Total Minutes 152631	Ea. Pump Total Min.	13848	16906	Total Gal Pumped 34290710	Overall Ave GPM 224.6641
			Ave min. per day	130.6	159.5		
			Total ave. per day	290.1 Min.			

S:\Active\135-12584-08-079 Fife 2008 CRS Mod\Design\New Tech Memo, 2008\PS- Pump Times & Rates.xls

Lift Station Operation Log, PS#11

This flow is pumped to PS 8

Transcribed from copy of hand tabulated log by City

Pumps: Cornell ? ?RPM, ?" Imp. Approx Flow

73 gpm NUMBER IS A PLACE HOLDER FOR NOW

Flow velocity in 4" FM if pump discharges were additive = 3.727

Date	Hour	Min	Duration Days	Hrs	Min.	Total Min	Pump 1 Min Meter	Pump 2 Min Meter	Pump 1 Time, Min	Pump 2 Time, Min	Pump 1 Gal	Pump 2 Gal	Total Gal	24 hr Ave GPM	24 hr Total GPM
2/22/08	11	9					449.0	435.9							
2/25/08	10	50	3	-1	41	4301	449.6	436.4	0.6	0.5	43.8	36.5	80.3	0.019	27
2/29/08	10	53	4	0	3	5763	450.2	437.1	0.6	0.7	43.8	51.1	94.9	0.016	24
3/3/08	10	49	3	0	-4	4316	450.8	437.7	0.6	0.6	43.8	43.8	87.6	0.020	29
3/7/08	13	1	4	3	-48	5892	451.5	438.4	0.7	0.7	51.1	51.1	102.2	0.017	25
3/10/08	10	48	3	-3	47	4187	452.0	439.0	0.5	0.6	36.5	43.8	80.3	0.019	28
3/14/08	11	0	4	1	-48	5772	452.6	439.7	0.6	0.7	43.8	51.1	94.9	0.016	24
3/17/08	12	49	3	1	49	4429	453.4	440.3	0.8	0.6	58.4	43.8	102.2	0.023	33
3/21/08	10	40	4	-2	-9	5631	454.0	441.0	0.6	0.7	43.8	51.1	94.9	0.017	24
3/25/08	12	53	4	2	13	5893	454.7	441.7	0.7	0.7	51.1	51.1	102.2	0.017	25
3/28/08	10	44	3	-2	-9	4191	455.3	442.2	0.6	0.5	43.8	36.5	80.3	0.019	28
3/31/08	11	34	3	1	-10	4370	455.8	442.8	0.5	0.6	36.5	43.8	80.3	0.018	26
4/4/08	13	2	4	2	-32	5848	456.5	443.5	0.7	0.7	51.1	51.1	102.2	0.017	25
4/7/08	11	20	3	-2	18	4218	457.1	444.1	0.6	0.6	43.8	43.8	87.6	0.021	30
4/11/08	13	48	4	2	28	5908	457.8	444.8	0.7	0.7	51.1	51.1	102.2	0.017	25
4/14/08	9	1	3	-4	-47	4033	458.3	445.3	0.5	0.5	36.5	36.5	73	0.018	26
4/18/08	11	12	4	2	11	5891	459.1	446.1	0.8	0.8	58.4	58.4	116.8	0.020	29
4/21/08	13	13	3	2	1	4441	459.6	446.7	0.5	0.6	36.5	43.8	80.3	0.018	26
4/25/08	10	47	4	-3	34	5614	460.4	447.5	0.8	0.8	58.4	58.4	116.8	0.021	30
4/28/08	10	40	3	0	-7	4313	460.9	448.0	0.5	0.5	36.5	36.5	73	0.017	24
5/2/08	11	35	4	1	-5	5815	461.6	448.7	0.7	0.7	51.1	51.1	102.2	0.018	25
5/5/08	11	24	3	0	-11	4309	462.2	449.3	0.6	0.6	43.8	43.8	87.6	0.020	29
5/13/08	9	20	8	-2	-4	11396	463.6	450.7	1.4	1.4	102.2	102.2	204.4	0.018	26
5/16/08	14	43	3	5	23	4643	464.2	451.3	0.6	0.6	43.8	43.8	87.6	0.019	27
5/19/08	13	51	3	-1	8	4268	464.7	451.8	0.5	0.5	36.5	36.5	73	0.017	25
5/23/08	11	11	4	-2	-40	5600	465.3	452.5	0.6	0.7	43.8	51.1	94.9	0.017	24
5/27/08	11	11	4	0	0	5760	466.1	453.2	0.8	0.7	58.4	51.1	109.5	0.019	27
5/30/08	13	21	3	2	10	4450	466.8	453.9	0.7	0.7	51.1	51.1	102.2	0.023	33
6/2/08	11	23	3	-2	2	4202	467.3	454.5	0.5	0.6	36.5	43.8	80.3	0.019	28
6/6/08	11	25	4	0	2	5762	468.0	455.2	0.7	0.7	51.1	51.1	102.2	0.018	26
6/9/08	11	30	3	0	5	4325	468.5	455.8	0.5	0.6	36.5	43.8	80.3	0.019	27

Total Minutes	Total Gal Pumped	Overall Ave GPM
2E+05	2876.2	0.018492

Lift Station Operation Log, PS#6

Transcribed from copy of hand tabulated log by City

Flow velocity in 8" FM if pumps are additive = 55.405

Pumps 1 Approx Flow 2170 gpm Flow is ave of design data points
Pumps 2 Approx Flow 2170 gpm
Pumps 3 Approx Flow 2170 gpm

Date	Hour	Min	Duration Days	Hrs	Min.	Total Min	Pump 1 Min Meter	Pump 2 Min Meter	Pump 3 Min Meter	Pump 1 Time, Min	Pump 2 Time, Min	Pump 3 Time, Min	Total pump Time Min	Pump 1 Gal	Pump 2 Gal	Pump 3 Gal	Total Gal	24 hr Ave GPM	24 hr Total GPM
2/19/08	9	0					212910	239726	231188										
2/22/08	10	14	3	1	14	4394	213464	240284	231725	554	538	537	1629	1202180	1167460	1165290	3534930	804.5	1158466
2/25/08	10	0	3	0	-14	4306	213990	240784	232229	526	520	504	1550	1141420	1128400	1093680	3363500	781.1	1124812
2/28/08	10	22	3	0	22	4342	214692	241430	232852	702	646	623	1971	1523340	1401820	1351910	4277070	985.0	1418466
3/3/08	10	29	4	0	7	5767	215208	241971	233341	516	541	489	1546	1119720	1173970	1061130	3354820	581.7	837687
3/7/08	11	8	4	1	-21	5799	215909	242664	233990	701	693	649	2043	1521170	1503810	1408330	4433310	764.5	1100874
3/10/08	10	24	3	-1	16	4276	216420	243149	234482	511	485	492	1488	1108870	1052450	1067640	3228960	755.1	1087395
3/14/08	10	20	4	0	-4	5756	217131	243835	235166	711	686	684	2081	1542870	1488620	1484280	4515770	784.5	1129727
3/17/08	11	10	3	1	-10	4370	217747	244439	235719	616	604	553	1773	1336720	1310680	1200010	3847410	880.4	1267796
3/21/08	10	40	4	-1	30	5730	218471	245141	236415	724	702	696	2122	1571080	1523340	1510320	4604740	803.6	1157212
3/24/08	11	50	3	1	10	4390	219073	245727	236982	602	586	567	1755	1306340	1271620	1230390	3808350	867.5	1249208
3/28/08	9	13	4	-2	-37	5603	219977	246616	237855	904	889	873	2666	1961680	1929130	1894410	5785220	1032.5	1486831
3/31/08	9	8	3	0	-5	4315	220757	247426	238648	780	810	793	2383	1692600	1757700	1720810	5171110	1198.4	1725701
4/4/08	9	23	4	0	15	5775	221619	248262	239484	862	836	836	2534	1870540	1814120	1814120	5498780	952.2	1371124
4/7/08	10	17	3	1	-6	4374	222184	248808	240043	565	546	559	1670	1226050	1184820	1213030	3623900	828.5	1193053
4/11/08	11	26	4	1	9	5829	222921	249541	240743	737	733	700	2170	1599290	1590610	1519000	4708900	807.8	1163290
4/14/08	11	1	3	0	-25	4295	223468	250073	241269	547	532	526	1605	1186990	1154440	1141420	3482850	810.9	1167708
4/18/08	10	47	4	-1	46	5746	224160	250761	241915	692	688	646	2026	1501640	1492960	1401820	4396420	765.1	1101783
4/21/08	10	58	3	0	11	4331	224696	251278	242429	536	517	514	1567	1163120	1121890	1115380	3400390	785.1	1130585
4/25/08	10	7	4	0	-51	5709	225394	252012	243130	698	734	701	2133	1514660	1592780	1521170	4628610	810.8	1167490
4/28/08	9	2	3	-1	-5	4255	225925	252539	243632	531	527	502	1560	1152270	1143590	1089340	3385200	795.6	1145638
5/2/08	10	14	4	1	12	5832	226642	253254	244365	717	715	733	2165	1555890	1551550	1590610	4698050	805.6	1160012
5/5/08	10	0	3	0	-14	4306	227190	253786	244878	548	532	513	1593	1189160	1154440	1113210	3456810	802.8	1156016
5/9/08	11	5	4	1	5	5825	227922	254494	245548	732	708	670	2110	1588440	1536360	1453900	4578700	786.0	1131902
5/12/08	9	5	3	-2	0	4200	228439	255023	246028	517	529	480	1526	1121890	1147930	1041600	3311420	788.4	1135344
5/16/08	10	16	4	1	11	5831	229178	255740	246723	739	717	695	2151	1603630	1555890	1508150	4667670	800.5	1152709
5/19/08	13	0	3	3	-16	4484	229715	256293	247241	537	553	518	1608	1165290	1200010	1124060	3489360	778.2	1120579
5/23/08	10	19	4	-3	19	5599	230407	256979	247885	692	686	644	2022	1501640	1488620	1397480	4387740	783.7	1128478
5/27/08	10	56	4	0	37	5797	231102	257657	248525	695	678	640	2013	1508150	1471260	1388800	4368210	753.5	1085082
5/30/08	9	3	3	-1	-53	4207	231616	258172	248982	514	515	457	1486	1115380	1117550	991690	3224620	766.5	1103744
6/2/08	10	41	3	1	38	4418	232192	258709	249515	576	537	533	1646	1249920	1165290	1156610	3571820	808.5	1164197

Days	104	Total Minutes	149861

Ea. Pump			
Total Min.	19282	18983	18327
Ave min. per day	185.4	182.5	176.2

Total ave per day 544.2 Min.

Total Gal Pumped	Overall Ave GPM
122804640	819.457

Lift Station Operation Log, PS#5

Transcribed from copy of hand tabulated log by City

Flow velocity in 8" FM if pumps are additive = 40.852

Pumps 1 Approx Flow 1600 gpm Flow is ave of design data points

Pumps 2 Approx Flow 1600 gpm

Pumps 3 Approx Flow 1600 gpm

Date	Hour	Min	Duration Days	Hrs	Min.	Total Min	Pump 1 Min Meter	Pump 2 Min Meter	Pump 3 Min Meter	Pump 1 Time, Min	Pump 2 Time, Min	Pump 3 Time, Min	Total pump Time Min	Pump 1 Gal	Pump 2 Gal	Pump 3 Gal	Total Gal	24 hr Ave GPM	24 hr Total GPM
2/22/08	10	44					258248	245554	241749										
2/25/08	11	25	3	1	-19	4361	258782	246055	242273	534	501	524	1559	854400	801600	838400	2494400	572.0	823650
2/28/08	10	15	3	-1	-10	4250	259450	246723	242956	668	668	683	2019	1068800	1068800	1092800	3230400	760.1	1094536
3/3/08	10	20	4	0	5	5765	259985	247234	243497	535	511	541	1587	856000	817600	865600	2539200	440.5	634249
3/7/08	11	0	4	1	-20	5800	260694	247913	244200	709	679	703	2091	1134400	1086400	1124800	3345600	576.8	830632
3/10/08	10	29	3	-1	29	4289	261203	248411	244682	509	498	482	1489	814400	796800	771200	2382400	555.5	799873
3/14/08	8	35	4	-2	6	5646	261907	249099	245408	704	688	726	2118	1126400	1100800	1161600	3388800	600.2	864306
3/17/08	11	39	3	3	4	4504	262504	249670	245988	597	571	580	1748	955200	913600	928000	2796800	621.0	894181
3/21/08	10	25	4	-1	-14	5686	263239	250372	246688	735	702	700	2137	1176000	1123200	1120000	3419200	601.3	865925
3/25/08	10	2	4	0	-23	5737	263999	251105	247434	760	733	746	2239	1216000	1172800	1193600	3582400	624.4	899191
3/28/08	9	6	3	-1	4	4264	264661	251753	248116	662	648	682	1992	1059200	1036800	1091200	3187200	747.5	1076353
3/31/08	9	17	3	0	11	4331	265407	252463	248841	746	710	725	2181	1193600	1136000	1160000	3489600	805.7	1160246
4/4/08	10	13	4	1	-4	5816	266242	253201	249665	835	738	824	2397	1336000	1180800	1318400	3835200	659.4	949568
4/7/08	10	49	3	0	36	4356	266798	253811	250206	556	610	541	1707	889600	976000	865600	2731200	627.0	902876
4/11/08	11	19	4	1	-30	5790	267531	254508	250935	733	697	729	2159	1172800	1115200	1166400	3454400	596.6	859125
4/14/08	10	49	3	-1	30	4290	268070	255019	251456	539	511	521	1571	862400	817600	833600	2513600	585.9	843726
4/18/08	10	22	4	0	-27	5733	268771	255690	252158	701	671	702	2074	1121600	1073600	1123200	3318400	578.8	833507
4/21/08	11	19	3	1	-3	4377	269296	256210	252699	525	520	541	1586	840000	832000	865600	2537600	579.8	834851
4/25/08	8	59	4	-3	40	5620	270007	256892	253347	711	682	648	2041	1137600	1091200	1036800	3265600	581.1	836737
4/28/08	9	24	3	1	-35	4345	270547	257402	253928	540	510	581	1631	864000	816000	929600	2609600	600.6	864862
5/2/08	10	6	4	1	-18	5802	271276	258118	254659	729	716	731	2176	1166400	1145600	1169600	3481600	600.1	864099
5/5/08	10	28	3	0	22	4342	271811	258637	255179	535	519	520	1574	856000	830400	832000	2518400	580.0	835213
5/9/08	10	30	4	0	2	5762	272527	259319	255898	716	682	719	2117	1145600	1091200	1150400	3387200	587.9	846506
5/12/08	15	30	3	5	0	4620	273099	259855	256468	572	536	570	1678	915200	857600	912000	2684800	581.1	836821
5/16/08	11	5	4	-4	-25	5495	273757	260519	257143	658	664	675	1997	1052800	1062400	1080000	3195200	581.5	837323
5/19/08	8	41	3	-3	36	4176	274267	261002	257664	510	483	521	1514	816000	772800	833600	2422400	580.1	835310
5/23/08	9	59	4	1	18	5838	275040	261722	258404	773	720	740	2233	1236800	1152000	1184000	3572800	612.0	881266
5/27/08	10	32	4	1	-27	5793	275740	262419	259111	700	697	707	2104	1120000	1115200	1131200	3366400	581.1	836806
5/30/08	10	50	3	0	18	4338	276279	262993	259656	539	574	545	1658	862400	918400	872000	2652800	611.5	880598
6/2/08	10	30	3	0	-20	4300	276810	263459	260184	531	466	528	1525	849600	745600	844800	2440000	567.4	817116
6/6/08	9	20	4	-1	-10	5690	277545	264155	260923	735	696	739	2170	1176000	1113600	1182400	3472000	610.2	878678

		Total Minutes					Total Gal Pumped	Overall Ave GPM
Days	105	145426	Ea. Pump Total Min.	19297	18601	19174	87843200	604.0405
			Ave min. per day	183.8	177.2	182.6		
				Total ave per day		543.5 Min.		